Claims

What is claimed is:

1. An apparatus for cutting a tubular member, comprising:
a support member; and
a plurality of movable cutting elements coupled to the support member.

2. The apparatus of claim 1, further comprising:
an actuator coupled to the support member for moving the cutting elements between a first position and a second position;
wherein in the first position, the cutting elements do not engage the tubular member; and
wherein in the second position, the cutting elements engage the tubular member.

3. The apparatus of claim 2, further comprising:
a sensor coupled to the support member for sensing the internal diameter of the tubular member.

4. The apparatus of claim 3, wherein the sensor prevents the cutting elements from being moved to the second position if the internal diameter of the tubular member is less than a predetermined value.

5. The apparatus of claim 2, wherein the cutting elements comprise:
a first set of cutting elements; and
a second set of cutting elements;
wherein the first set of cutting elements are interleaved with the second set of cutting elements.

6. The apparatus of claim 5, wherein in the first position, the first set of cutting elements are not axially aligned with the second set of cutting elements.

7. The apparatus of claim 5, wherein in the second position, the first set of cutting elements are axially aligned with the second set of cutting elements.

8. An apparatus for gripping a tubular member, comprising:

a plurality of movable gripping elements.

9. The apparatus of claim 8, wherein the gripping elements are moveable in a radial direction.

10. The apparatus of claim 8, wherein the gripping elements are moveable in an axial direction.

11. The apparatus of claim 8, wherein the gripping elements are moveable from a first position to a second position; wherein in the first position, the gripping elements do not engage the tubular member; wherein in the second position, the gripping elements do engage the tubular member; and wherein, during the movement from the first position to the second position, the gripping elements move in a radial and an axial direction.

12. The apparatus of claim 8, wherein the gripping elements are moveable from a first position to a second position; wherein in the first position, the gripping elements do not engage the tubular member; wherein in the second position, the gripping elements do engage the tubular member; and wherein, during the movement from the first position to the second position, the gripping elements move in a radial direction.

13. The apparatus of claim 8, wherein the gripping elements are moveable from a first position to a second position; wherein in the first position, the gripping elements do not engage the tubular member; wherein in the second position, the gripping elements do engage the tubular member; and wherein, during the movement from the first position to the second position, the gripping elements move in an axial direction.

14. The apparatus of claim 8, wherein, in a first axial direction, the gripping device grips the tubular member; and wherein, in a second axial direction, the gripping device does not grip the tubular member.

15. The apparatus of claim 8, further comprising an actuator for moving the gripping elements.

16. The apparatus of claim 8, wherein the gripping elements comprise:

a plurality of separate and distinct gripping elements.

17. An apparatus for controlling a packer, comprising:
a tubular support member;
one or more drag blocks releasably coupled to the tubular support member; and
a tubular stinger coupled to the tubular support member for engaging the packer.

18. The apparatus of claim 17, further comprising a tubular sleeve coupled to the drag blocks.

19. The apparatus of claim 17, wherein the tubular support member comprises one or more axially aligned teeth for engaging the packer.

20. A packer comprising:
a support member defining a passage;
a shoe comprising a float valve coupled to an end of the support member;
one or more compressible packer elements movably coupled to the support member; and
a sliding sleeve valve movably positioned within the passage of the support member.

21. A method of cutting a tubular member, comprising:
positioning a plurality of cutting elements within the tubular member; and
bringing the cutting elements into engagement with the tubular member.

22. The method of claim 21, wherein the cutting elements comprise:
a first group of cutting elements; and
a second group of cutting elements;
wherein the first group of cutting elements are interleaved with the second group of cutting elements.

23. The method of claim 21, wherein bringing the cutting elements into engagement with the tubular member comprises:
bringing the cutting elements into axial alignment.

24. The method of claim 23, wherein bringing the cutting elements into engagement with the tubular member further comprises:

pivoting the cutting elements.

25. The method of claim 23, wherein bringing the cutting elements into engagement with the tubular member further comprises:

translating the cutting elements.

26. The method of claim 23, wherein bringing the cutting elements into engagement with the tubular member further comprises:

pivoting the cutting elements; and

translating the cutting elements.

27. The method of claim 21, wherein bringing the cutting elements into engagement with the tubular member comprises:

rotating the cutting elements about a common axis.

28. The method of claim 21, wherein bringing the cutting elements into engagement with the tubular member comprises:

pivoting the cutting elements about corresponding axes;

translating the cutting elements; and

rotating the cutting elements about a common axis.

29. The method of claim 21, further comprising:

preventing the cutting elements from coming into engagement with the tubular member if the inside diameter of the tubular member is less than a predetermined value.

30. The method of claim 29, wherein preventing the cutting elements from coming into engagement with the tubular member if the inside diameter of the tubular member is less than a predetermined value comprises:

sensing the inside diameter of the tubular member.

31. A method of gripping a tubular member, comprising:

positioning a plurality of gripping elements within the tubular member; and

bringing the gripping elements into engagement with the tubular member.

32. The method of claim 31, wherein bringing the gripping elements into engagement with the tubular member comprises:

displacing the gripping elements in an axial direction; and

displacing the gripping elements in a radial direction.

33. The method of claim 31, further comprising:

biasing the gripping elements against engagement with the tubular member.

34. An apparatus for radially expanding and plastically deforming an expandable tubular member, comprising:

a support member;

a cutting device for cutting the tubular member coupled to the support member; and

an expansion device for radially expanding and plastically deforming the tubular member coupled to the support member.

35. An apparatus for radially expanding and plastically deforming an expandable tubular member, comprising:

a support member;

an expansion device for radially expanding and plastically deforming the tubular member coupled to the support member; and

an actuator coupled to the support member for displacing the expansion device relative to the support member.

36. An apparatus for radially expanding and plastically deforming an expandable tubular member, comprising:

a support member;

an expansion device for radially expanding and plastically deforming the tubular member coupled to the support member; and

a sealing assembly for sealing an annulus defined between the support member and the tubular member.

37. An apparatus for radially expanding and plastically deforming an expandable tubular

member, comprising:

a support member;

a first expansion device for radially expanding and plastically deforming the tubular member coupled to the support member; and

a second expansion device for radially expanding and plastically deforming the tubular member coupled to the support member.

38. An apparatus for radially expanding and plastically deforming an expandable tubular member, comprising:

a support member;

an expansion device for radially expanding and plastically deforming the tubular member coupled to the support member; and

a packer coupled to the support member.

39. An actuator, comprising:

a tubular housing;

a tubular piston rod movably coupled to and at least partially positioned within the housing;

a plurality of annular piston chambers defined by the tubular housing and the tubular piston rod; and

a plurality of tubular pistons coupled to the tubular piston rod, each tubular piston movably positioned within a corresponding annular piston chamber.

40. A method of radially expanding and plastically deforming an expandable tubular member within a borehole having a preexisting wellbore casing, comprising:

positioning the tubular member within the borehole in overlapping relation to the wellbore casing;

radially expanding and plastically deforming a portion of the tubular member to form a bell section; and

radially expanding and plastically deforming a portion of the tubular member above the bell section comprising a portion of the tubular member that overlaps with the wellbore casing;

wherein the inside diameter of the bell section is greater than the inside diameter of the radially expanded and plastically deformed portion of the tubular member above the bell section.

41. A method for forming a mono diameter wellbore casing, comprising:

positioning an adjustable expansion device within a first expandable tubular member;

supporting the first expandable tubular member and the adjustable expansion device within a borehole;

lowering the adjustable expansion device out of the first expandable tubular member;

increasing the outside dimension of the adjustable expansion device;

displacing the adjustable expansion device upwardly relative to the first expandable tubular member m times to radially expand and plastically deform m portions of the first expandable tubular member within the borehole;

positioning the adjustable expansion device within a second expandable tubular member;

supporting the second expandable tubular member and the adjustable expansion device within the borehole in overlapping relation to the first expandable tubular member;

lowering the adjustable expansion device out of the second expandable tubular member;

increasing the outside dimension of the adjustable expansion device; and

displacing the adjustable expansion device upwardly relative to the second expandable tubular member n times to radially expand and plastically deform n portions of the second expandable tubular member within the borehole.

42. A method for radially expanding and plastically deforming an expandable tubular member within a borehole, comprising:

positioning an adjustable expansion device within the expandable tubular member;

supporting the expandable tubular member and the adjustable expansion device within the borehole;

lowering the adjustable expansion device out of the expandable tubular member;

increasing the outside dimension of the adjustable expansion device;

displacing the adjustable expansion mandrel upwardly relative to the expandable tubular member n times to radially expand and plastically deform n portions of the expandable tubular member within the borehole; and

pressurizing an interior region of the expandable tubular member above the adjustable expansion device during the radial expansion and plastic deformation of the expandable tubular member within the borehole.

43. A method for radially expanding and plastically deforming an expandable tubular member within a borehole, comprising:

supporting the expandable tubular member, an hydraulic actuator, and an adjustable expansion device within the borehole;

increasing the size of the adjustable expansion device; and

displacing the adjustable expansion device upwardly relative to the expandable tubular member using the hydraulic actuator to radially expand and plastically deform a portion of the expandable tubular member.

44. A method for forming a mono diameter wellbore casing within a borehole that includes a preexisting wellbore casing, comprising:

supporting the expandable tubular member, an hydraulic actuator, and an adjustable expansion device within the borehole;

increasing the size of the adjustable expansion device;

displacing the adjustable expansion device upwardly relative to the expandable tubular member using the hydraulic actuator to radially expand and plastically deform a portion of the expandable tubular member; and

displacing the adjustable expansion device upwardly relative to the expandable tubular member to radially expand and plastically deform the remaining portion of the expandable tubular member and a portion of the preexisting wellbore casing that overlaps with an end of the remaining portion of the expandable tubular member.

45. A method of radially expanding and plastically deforming a tubular member, comprising:

positioning the tubular member within a preexisting structure;

radially expanding and plastically deforming a lower portion of the tubular member to form a bell section; and

radially expanding and plastically deforming a portion of the tubular member above the bell section.

46. A method of radially expanding and plastically deforming a tubular member, comprising:

applying internal pressure to the inside surface of the tubular member at a plurality of discrete location separated from one another.

47. A system for radially expanding and plastically deforming an expandable tubular member within a borehole having a preexisting wellbore casing, comprising:

means for positioning the tubular member within the borehole in overlapping relation to the wellbore casing;

means for radially expanding and plastically deforming a portion of the tubular member to form a bell section; and

means for radially expanding and plastically deforming a portion of the tubular member above the bell section comprising a portion of the tubular member that overlaps with the wellbore casing;

wherein the inside diameter of the bell section is greater than the inside diameter of the radially expanded and plastically deformed portion of the tubular member above the bell section.

48. A system for forming a mono diameter wellbore casing, comprising:

means for positioning an adjustable expansion device within a first expandable tubular member;

means for supporting the first expandable tubular member and the adjustable expansion device within a borehole;

means for lowering the adjustable expansion device out of the first expandable tubular member;

means for increasing the outside dimension of the adjustable expansion device;

means for displacing the adjustable expansion device upwardly relative to the first expandable tubular member m times to radially expand and plastically deform m portions of the first expandable tubular member within the borehole;

means for positioning the adjustable expansion device within a second expandable tubular member;

means for supporting the second expandable tubular member and the adjustable expansion device within the borehole in overlapping relation to the first expandable tubular member;

means for lowering the adjustable expansion device out of the second expandable tubular member;

means for increasing the outside dimension of the adjustable expansion device; and

means for displacing the adjustable expansion device upwardly relative to the second expandable tubular member n times to radially expand and plastically deform n

portions of the second expandable tubular member within the borehole.

49. A system for radially expanding and plastically deforming an expandable tubular member within a borehole, comprising:

means for positioning an adjustable expansion device within the expandable tubular member;

means for supporting the expandable tubular member and the adjustable expansion device within the borehole;

means for lowering the adjustable expansion device out of the expandable tubular member;

means for increasing the outside dimension of the adjustable expansion device;

means for displacing the adjustable expansion mandrel upwardly relative to the expandable tubular member n times to radially expand and plastically deform n portions of the expandable tubular member within the borehole; and

means for pressurizing an interior region of the expandable tubular member above the adjustable expansion device during the radial expansion and plastic deformation of the expandable tubular member within the borehole.

50. A system for radially expanding and plastically deforming an expandable tubular member within a borehole, comprising:

means for supporting the expandable tubular member, an hydraulic actuator, and an adjustable expansion device within the borehole;

means for increasing the size of the adjustable expansion device; and

means for displacing the adjustable expansion device upwardly relative to the expandable tubular member using the hydraulic actuator to radially expand and plastically deform a portion of the expandable tubular member.

51. A system for forming a mono diameter wellbore casing within a borehole that includes a preexisting wellbore casing, comprising:

means for supporting the expandable tubular member, an hydraulic actuator, and an adjustable expansion device within the borehole;

means for increasing the size of the adjustable expansion device;

means for displacing the adjustable expansion device upwardly relative to the expandable tubular member using the hydraulic actuator to radially expand and

plastically deform a portion of the expandable tubular member; and

means for displacing the adjustable expansion device upwardly relative to the expandable tubular member to radially expand and plastically deform the remaining portion of the expandable tubular member and a portion of the preexisting wellbore casing that overlaps with an end of the remaining portion of the expandable tubular member.

52. A system for radially expanding and plastically deforming a tubular member, comprising:

means for positioning the tubular member within a preexisting structure;

means for radially expanding and plastically deforming a lower portion of the tubular member to form a bell section; and

means for radially expanding and plastically deforming a portion of the tubular member above the bell section.

53. A system of radially expanding and plastically deforming a tubular member, comprising:

a support member; and

means for applying internal pressure to the inside surface of the tubular member at a plurality of discrete location separated from one another coupled to the support member.

54. A method of injecting a hardenable fluidic sealing material into an annulus between a tubular member and a preexisting structure, comprising:

positioning the tubular member into the preexisting structure;

sealing off an end of the tubular member;

operating a valve within the end of the tubular member; and

injecting a hardenable fluidic sealing material through the valve into the annulus between the tubular member and the preexisting structure.

55. A system for cutting a tubular member, comprising:

means for positioning a plurality of cutting elements within the tubular member; and

means for bringing the cutting elements into engagement with the tubular member.

56. A system for gripping a tubular member, comprising:

means for positioning a plurality of gripping elements within the tubular member; and

means for bringing the gripping elements into engagement with the tubular member.

57. An actuator system, comprising:
a support member; and
means for pressurizing a plurality of pressure chambers coupled to the support member.

58. A system for injecting a hardenable fluidic sealing material into an annulus between a tubular member and a preexisting structure, comprising:
means for positioning the tubular member into the preexisting structure;
means for sealing off an end of the tubular member;
means for operating a valve within the end of the tubular member; and
means for injecting a hardenable fluidic sealing material through the valve into the annulus between the tubular member and the preexisting structure.

59. A method of engaging a tubular member, comprising:
positioning a plurality of elements within the tubular member; and
bringing the elements into engagement with the tubular member.

60. A system for engaging a tubular member, comprising:
means for positioning a plurality of elements within the tubular member; and
means for bringing the elements into engagement with the tubular member.